REMARKS

This amendment is responsive to the Final Office Action of June 3, 2008. Reconsideration and allowance of the claims 2-14 are requested.

The Office Action

Claims 2-5, 7, and 10-12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Vollmar ("Iterative Reconstruction of Emission Tomography Data...") as viewed by Townsend (US 6,490,476), as further modified by Delaney ("Multi-Resolution Tomographic Reconstruction Using Wavelets").

Claims 6, 8, 13, and 14 now stand under 35 U.S.C. § 103 as being unpatentable over Vollmar in view of Delaney.

Claim 7 stand rejected under 35 U.S.C. § 112, first paragraph.

Claim 9 stands rejected under 35 U.S.C. § 102 as being anticipated by Vollmar.

35 U.S.C. § 112, First Paragraph

Although the specification does not use the term "tangible computer readable medium", it is submitted that this term is supported by the specification. A computer program, particularly when it is being used to perform a claimed method, cannot exist in a vacuum. Rather, it must be present on some tangible device. The present application provides support for the computer program to be on a device. See, for example, page 2, line 20, page 6, line 32, and others. It is submitted that a device, by definition, is tangible and more specifically, a tangible medium. Moreover, to perform a computer program, it is submitted that the medium must be computer readable.

However, in order to advance prosecution, the applicant has changed this phrase to "computer". This term finds antecedent basis at least in claim 7, as originally filed.

The Present Amendment Should Be Entered

First, the Advisory Action of August 26, 2008 declined entry of Amendment D solely on the basis of the amendments to claim 8. The present

amendment is the same as not entered Amendment D, but with no amendments to claim 8. Accordingly, it is submitted that this amendment should be entered.

Second, the amendment to claim 7 reduces the issues on appeal. Moreover, the amendment to claim 7 would not require any further search or consideration.

As the applicant understands the Examiner's reasoning regarding the change of rejection applied to claims 13 and 14, it appears that in the Office Action of March 18, 2008, the Examiner stated that claims 13 and 14 were rejected as being anticipated over Vollmar when she actually intended that they should be rejected over Vollmar in view of Delaney. Thus, when the Office Action of June 3, 2008 stated that claims 13 and 14 were now rejected based on Vollmar in view of Delaney, the Examiner held that this was not a new ground of rejection because it was the rejection the Examiner had ***intended*** to make in the Office Action of March 18, 2008. It is submitted that, to the contrary, when the Examiner changes the stated grounds of rejection, the changed grounds of rejection are a new rejection, regardless of the Examiner's intention. Nonetheless, because the previously proposed amendment to claim 8 was for emphasis and was not necessary for patentability, the applicant has, by this amendment, withdrawn the proposal to amend claim 8, hence the Examiner's objection to the entry of the amendment.

MPEP 2144.03

The Examiner's use of the terminology "common knowledge in the art as evidenced by Delaney" is unclear. The applicant agrees that Delaney is prior art and can be used as a reference for that which it discloses. However, to the extent that the Examiner is looking to use alleged "common knowledge" that is not specifically disclosed in Delaney, the applicant challenges such assertion, and pursuant to MPEP 2144.03, puts the Examiner to her proofs to provide references that clearly show that any additionally alleged "common knowledge" is, in fact, known.

The Claims Distinguish Patentably Over the References of Record

First, the applicant refers the Examiner to the arguments set forth in the Remarks of Amendment C of May 15, 2008 and incorporates them herein, by reference, in their entirety.

Second, the Examiner's primary reference, Vollmar, is not an enabling reference. It is submitted that Vollmar taken alone, is not enabling. Rather, Vollmar must be combined with at least the article to Schmidlin "Iterative Reconstruction of PET Images Using a High-Overrelaxation Single-Projection Algorithm", the article to Lipinski "Expectation Maximization Reconstruction of Position Emission Tomography Images Using Anatomical Magnetic Resonance Information", and the article to Shepp and Vardi ("Maximum Likelihood Reconstruction in Position Emission Tomography, IEEE Trans. Med. Imaging, 1(2), 11-122 (1982)) referenced in Schmidlin, an explanation of sinograms, and possibly other references that one would be able to practice the method of Vollmar. Moreover, a knowledge of the details of the Vollmar, Schmidlin, Lipinski, Shepp, and other articles will be helpful to the Board in understand the method which the Examiner is purporting to apply in sufficient detail to understand the incompatibility of the Vollmar, et al. technique with Townsend and/or Delaney. Schmidlin and Delaney are of record, but not applied. The Examiner has declined to make the Shepp and Vardi article of record.

Because Vollmar does not contain with its four corners an enabling description, Vollmar is neither an anticipatory reference nor does it meet the requirements for a base reference in a 35 U.S.C. § 103 rejection.

Claims 2-5, 7, and 10-12 Distinguish Patentably Over the References of Record

First, **claim 10** calls for reconstructing the first image data set into a segmented first image. In Vollmar, the second (MR) image is segmented using thresholds to divide it among different classes, e.g., types of tissues. Each of the different tissue types is then subject to a different Markov parameter β during the reconstruction. In this manner, the reconstruction technique for the first (PET) image is regionally optimized, but the resultant image is not segmented. Similarly, in Delaney, the resultant image has a non-uniform resolution with an area containing the

subject matter of interest having a better resolution than surrounding portions of the image. But the resultant image is not segmented.

Second, claim 10 calls for forming a segmented first image data set. As the Examiner accurately concludes, Vollmar does not form a segmented first image data set. Delaney, which the Examiner relies on for this limitation, does not disclose a segmented first image data set either. Rather, Delaney reconstructs the entire data set (not a segment of a data set), but by using wavelets (a technique incompatible with the ML-EM technique of Vollmar), a smaller area of interest is reconstructed at full resolution and the rest of the image is reconstructed at a lower resolution. Delaney does not suggest segmenting the data set in order to achieve these two levels of resolution. Rather, Delaney merely applies different filters or other mathematical steps towards or the center or area of interest than the other areas of interest. Thus, Vollmar and Delaney both fail to suggest segmenting the (first) data set.

Third, claim 10 calls for forward projecting the segmented second image data set, which is a standard operation in an ML-EM reconstruction, but goes on to require the segmented image data (not the segmented image) to be associated with the first image data set. That is, rather than operating on the first image based on the second image, the operation is performed in forward-projected image data set space. While Townsend and others may disclose the step of forward-projecting, Townsend does not suggest that the first and second image data sets be associated in forward-projected image data space.

By way of background, when a 2D image is forward-projected into a line, typically all of the pixels which are intersected by each of a plurality of rays are summed to create the corresponding data points on the line. In the ML-EM reconstruction technique of Vollmar, the 2D image is forward-projected, a correction data line is determined, and the correction data line is backprojected into the image memory. Thus, Townsend, like the articles referenced in Vollmar, discloses that forward-projection is known, but does not suggest associating the first and second image data sets in forward projection data space.

For the above-reasons and the reasons set forth in the prior amendment, it is submitted that claim **10 and claims 2-5, 7, 11, and 12 dependent therefrom** distinguish patentably and unobviously over the references of record.

Claims 6, 13, and 14 Distinguish Patentably Over the References of Record

Claim 6 calls for a backprojection means which backprojects the first image data set into a first image to cooperate with a selection means in such a manner that the first tomographic image is calculated *exclusively* from the portion of the first image data set which are situated in the selected region. In Vollmar, there is no selected region. Rather, Vollmar performs a threshold segment which classifies all of the pixels in the second (MR) image into one of several classes (labeled "a"-"g" in Figure 4). There is no selected region. Consequently, when the first (PET) image is calculated, it is calculated from all portions of the first image data set and not exclusively from a portion of the first image set which is situated in a selection region.

Delaney fails to cure this shortcoming of Vollmar. Delaney, as set forth in the second paragraph of the introduction section in column 1 of page 799, calls for the entire image to be reconstructed, albeit with part of the image at full resolution and the rest of the image at a lower resolution. Thus, neither Vollmar nor Delaney, nor the combination thereof teach or fairly suggest calculating the first tomographic image exclusively from the portion of the first image data set which is situated in a selected image region.

Accordingly, it is submitted that **claim 6 and claims 13-14 dependent therefrom** distinguish patentably and unobviously over the references of record.

Claim 8 Distinguishes Patentably Over the References of Record

Claim 8 calls for segmenting the second image to define a selected image region. By contrast, the segmenting described in Vollmar classifies whether each pixel is one of a plurality of classes, e.g., tissue types. It does not select a region. By identifying different tissue types, Vollmar can use different Markov parameters when reconstructing data in corresponding portions of the first image. That is, Vollmar changes the Markov parameter in accordance with the class of pixel being reconstructed.

Delaney does not cure this shortcoming. Delaney defines a higher resolution area for reconstruction and a lower resolution area for reconstruction in the

single image to be reconstructed. There is no suggestion of using a segmentation in one image to segment a different image.

Claim 8 further calls for segmenting the first image data set. Neither Vollmar nor Delaney segment a first data set, and particularly not with an image region segmented from a second, different image. Thus, Delaney does not teach that the first image data set of Vollmar should be a segmented image data set, much less that it should be segmented in accordance with a selected region of a different image.

Further, claim 8 has been amended to emphasize that the reconstruction is done without calculating a backprojection entirely across the first spatial region. Again, both Delaney and Vollmar reconstruct the entire PET image region, they just process different portions somewhat differently.

Accordingly, it is submitted that **claim 8** distinguishes patentably and unobviously over the references of record.

Claim 9 is Not Anticipated by Vollmar

First, Vollmar, is not, in and of itself, an enabling reference. Accordingly, it cannot anticipate **claim 9**.

Claim 9 calls for the data from the first image data set to be selected using the second image data set. In Vollmar, all of the image data from the PET data set is used in the reconstruction. Vollmar may adjust the Markov parameter regionally, but all of the first image data set is used in reconstruction.

Claim 9 further calls for selecting a region to be imaged. The "segmentation" in Vollmar classifies the pixels by class, e.g., tissue type. Vollmar does not select a region to be imaged. All regions are imaged.

Claim 9 calls for calculating the image reconstruction from data in a region represented in the first image data set that corresponds to the selected region in the second image data set. There is no one selected region in the Vollmar MR data set, and all of the first (PET) image data set is reconstructed into the first (PET) image. The Markov parameter may vary regionally, but there is no suggestion of reconstructing a region of the first (PET) image data set that corresponds to the selected region in the MR image data set of Vollmar.

Accordingly, it is submitted that **claim 9** is not anticipated by Vollmar.

CONCLUSION

For the reasons set forth above, it is submitted that no claims are anticipated by and all claims distinguish patentably and unobviously over the references of record. An early allowance of all claims is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, she is requested to telephone Thomas Kocovsky at (216) 861-5582.

Respectfully submitted,

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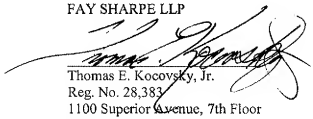

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